

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO. 97-228

WASTE DISCHARGE REQUIREMENTS
FOR
COUNTY OF MADERA
AND
MADERA DISPOSAL SYSTEMS, INC.
FOR
CONSTRUCTION AND OPERATION
FAIRMEAD MUNICIPAL SOLID WASTE LANDFILL
MADERA COUNTY

SWIS #20-AA-0002

The California Regional Water Quality Control Board, Central Valley Region, (hereafter Board) finds that:

1. The County of Madera owns a municipal solid waste landfill approximately one mile south of Fairmead, in Section 14, T10S, R16E, MDB&M, as shown in Attachment A, which is incorporated herein and made part of this Order. The waste management facility is operated by Madera Disposal Systems, Inc., a California corporation. The County of Madera and Madera Disposal Systems, Inc., are hereafter jointly referred to as Discharger.
2. The Discharger proposes to expand the waste management unit for the discharge of municipal solid waste to a 6.8-acre cell of Waste Management Unit 2, south of existing Waste Management Unit 1, and to approximately 101-acres in Waste Management Units 3a and 3b, southeast and east of existing Waste Management Unit 1.
3. On 21 June 1996, the Board adopted Order No. 96-160, which prescribes waste discharge requirements for the existing waste management facility. The facility is classified as a Class III landfill which accepts municipal solid waste in accordance with Title 27, California Code of Regulations, §20005, et seq. (Title 27).
4. The Board adopted Cleanup and Abatement Order No. 96-161 on 21 June 1996, requiring the Discharger to: 1) submit a time schedule for completion of the Evaluation Monitoring Program; 2) complete the Evaluation Monitoring Program in accordance with §2550.9(b) of Title 23, California Code of Regulations, §2510 et seq. (Chapter 15) and submit a report with the results of the spacial distribution of each Constituent Of Concern released; 3) submit an Engineering Feasibility Study for corrective action pursuant to §2550.8(k)(6) of Chapter 15; 4) submit for Board staff review and approval a time schedule to establish, implement, conduct, and complete a Corrective Action Program in accordance with §2550.10 of Chapter 15; and 5) implement the Corrective Action Program in accordance with §2550.10 of Chapter 15.

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SITE DESCRIPTION

5. The facility is in a topographically flat region of the San Joaquin Hydrologic Basin of the San Joaquin Valley. The native ground surface elevation ranges between approximately 247 feet above mean sea level in the northeast corner of the facility and 238 feet above mean sea level in the southwest corner of the facility. The ground surface slopes approximately 10 feet per mile toward the west-southwest.
6. The waste management facility is on fluvial and alluvial deposits typical of the San Joaquin Valley. The soils underlying the facility are fine-grained, low-permeability soils, consisting of interbedded, discontinuous layers of gravels, sands, silty-sands, silts, and silty-clays.
7. The hydraulic conductivity of the native soils underlying the waste management unit range between 1×10^{-2} and 8×10^{-8} cm/sec.
8. The waste management facility is not within a fault hazard zone. The closest active faults are approximately 35 miles to the east and approximately 37 to 59 miles to the southwest. Recorded magnitudes of seismic events along these faults range between 6.5 and 8 on the Richter scale.
9. Land within 1,000 feet of the facility is used for agriculture.
10. The facility receives an average of 10 inches of precipitation per year (Department of Water Resources Bulletin No. 135). The mean evaporation for this facility is approximately 66 inches per year (Department of Water Resources Bulletin No. 113-4).
11. The 100-year, 24-hour precipitation event for the facility is estimated to be 2.5 inches (*NOAA Atlas 2, Volume XI*).
12. The waste management facility is within a 100-year flood plain (within Zone A of the 1987, Flood Hazard Boundary Map, published by the U.S. Department of Housing and Urban Development).
13. There are approximately 84 domestic or agricultural supply wells within a 1-mile radius of the site. No surface springs have been observed.

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SURFACE AND GROUND WATER CONDITIONS

14. The *Water Quality Control Plan for the Sacramento River Basin and the San Joaquin River Basin, Third Edition* (hereafter Basin Plan) designates beneficial uses and contains water quality objectives for all waters of the Basin. This order implements the Basin Plan.
15. Surface drainage is southwesterly toward the Berenda Slough (a tributary to the Fresno River) in the Madera Hydrologic Area (545.20) of the San Joaquin Hydrologic Basin.
16. Groundwater monitoring data collected during the Second Quarter, 1997, indicates that groundwater exists in three zones, a perched groundwater zone approximately 103 feet bgs (elevation 141 feet MSL), a shallow groundwater zone approximately 110-127 feet bgs (elevation 128-118 feet MSL), and a regional groundwater zone approximately 164-183 feet bgs (elevation 79-65 feet MSL).
17. The flow direction of perched groundwater has not been defined since there is only one monitoring well currently screened in this groundwater zone. The Discharger proposes to estimate the perched groundwater flow direction during continued groundwater evaluation monitoring north of the facility. The predominant direction of shallow groundwater flow appears to be vertically downward toward the regional groundwater zone. The direction of regional groundwater flow is toward the northeast. Regional groundwater is heavily pumped on a seasonal basis from local agricultural wells which can alter the flow direction.
18. The average groundwater gradient for regional groundwater ranges between approximately .008 feet per foot and .016 feet per foot.
19. Monitoring data indicates that shallow and regional background groundwater quality is good, with specific electrical conductivity ranging from 200 to 650 micromhos/cm, and with total dissolved solids ranging from approximately 150 to 400 mg/l. Monitoring data indicates that perched groundwater quality is relatively poorer than that of shallow and regional groundwater with a specific electrical conductivity ranging up to 1,058 micromhos/cm and total dissolved solids of approximately 530 mg/l.
20. The designated beneficial uses of the groundwater, as specified in the Basin Plan, are domestic and municipal, agricultural, and industrial supply.
21. State Water Resources Control Board Order No. 97-03-DWQ (General Permit No. CAS000001), amended 17 April 1997, specifies waste discharge requirements for discharges of storm water associated with industrial activities, excluding construction

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activities, and requiring submission of a Notice Of Intent by industries to be covered under the permit. Waste disposal at landfills is considered an industrial activity requiring submittal of a Notice Of Intent for coverage under the general permit if storm water is to be discharged off-site. The Discharger proposes to retain all discharges of storm water runoff on-site.

22. The Discharger's proposed detection monitoring program for groundwater for this Waste Management Unit satisfies the requirements contained in §20380 through §20435 of Title 27.

WASTE AND SITE CLASSIFICATION

23. The Discharger proposes to discharge putrescible and nonputrescible municipal solid wastes, including garbage, food and beverage containers, paper, rubbish, ashes, industrial wastes, demolition and construction wastes, vehicle parts, discarded home and industrial appliances, manure, vegetable wastes, and wood and green wastes. These wastes are classified as 'nonhazardous solid waste' or 'inert waste' using the criteria set forth in Title 27 for a Class III landfill.
24. The site characteristics where the waste management unit is located (see Finding Nos. 6 & 7) do not meet the siting criteria for a Class III landfill contained in §20260(a) through (b)(1) of Title 27. As such, the site is not suitable for the discharge and containment of Class III wastes. Therefore, in order to discharge the wastes described in Finding No. 23, additional waste containment measures are required in accordance with §20260(b)(2) of Title 27 and State Water Resources Control Board Resolution No. 93-62.
25. The Discharger proposes a liner system which will be designed, constructed, and operated to prevent migration of wastes from the waste management unit to adjacent natural geologic materials, groundwater, or surface water during disposal operations, closure, and the post-closure maintenance period in accordance with the criteria set forth in Title 27 for a Class III landfill, and the provisions in State Water Resources Control Board Resolution No. 93-62 for municipal solid wastes.

GROUNDWATER MONITORING

26. The Discharger is required to monitor the groundwater and vadose zone in accordance with §20380 through §20435 of Title 27.

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27. The existing groundwater detection monitoring system consists of perched, shallow, and regional groundwater monitoring wells (see Attachment B, which is incorporated herein and made part of this Order). Shallow groundwater monitoring wells monitor the uppermost groundwater along the northern, southern, and western boundaries of Waste Management Units 1 and 2. Perched and regional groundwater monitoring wells monitor the uppermost groundwater along the eastern boundary of Waste Management Units 1 and 2. The Discharger proposes to install additional shallow groundwater monitoring wells along the western boundary of Waste Management Unit 2 and along the northeastern boundary of Waste Management Unit 1. The Discharger proposes to submit a plan for installing detection monitoring wells for Waste Management Unit 3 at least one year prior to discharge to this waste management unit.
28. The vadose zone beneath Waste Management Unit 1 is monitored by landfill gas probes screened between the 10 to 50-foot depth intervals. The Discharger proposes to monitor the vadose zone beneath Waste Management Units 2 and 3 using pan lysimeters.
29. Evaluation monitoring by the Discharger has determined that the nature of the release from Waste Management Unit 1 in the perched and shallow groundwater zones consists of volatile organic compounds. Evaluation monitoring has also delineated the eastern and southern lateral extents of the volatile organic compound plume in the shallow and perched groundwater zones. The vertical extent of the volatile organic plume is currently limited to the perched and shallow groundwater zones.

GROUNDWATER DEGRADATION

30. The nature of the release from Waste Management Unit 1 in perched groundwater consists of the volatile organic compounds PCE, CFC-12, and CFC-11, and to a lesser extent, TCE, cis-1,2-DCE, and 1,1-DCA.
31. The nature of the release from Waste Management Unit 1 in shallow groundwater consists of the volatile organic compounds PCE, CFC-12, and CFC-11, and to a lesser extent chloroethane, TCE, and 1,1-DCE.

CONSTRUCTION AND ENGINEERED ALTERNATIVE

32. On 17 June 1993, the State Water Resources Control Board adopted Resolution No. 93-62 implementing a State Policy for the construction, monitoring, and operation of municipal

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solid waste landfills that is consistent with the federal municipal solid waste regulations promulgated under Title 40, Code of Federal Regulations, Part 258 (Subtitle D).

33. Resolution No. 93-62 requires the construction of composite liner systems at municipal solid waste landfills that receive wastes after 9 October 1993. The prescriptive standard for a composite liner system consists of a minimum 40 mil thick (60 mil for HDPE) upper synthetic flexible membrane component and lower soil component of compacted clay a minimum of two feet thick with a hydraulic conductivity not to exceed 1×10^{-7} cm/sec.
34. Resolution No. 93-62 also allows the Board to consider the approval of engineered alternatives to the prescriptive standard. Section III.A.b. of Resolution No. 93-62 requires that the engineered alternative be of a composite design similar to the prescriptive standard.
35. Section 20080(b) of Title 27 allows the Board to consider the approval of an engineered alternative to the prescriptive standard. In order to approve an engineered alternative in accordance with §20080(c)(1) and (2) of Title 27, the Discharger must demonstrate that the prescriptive design is unreasonably and unnecessarily burdensome and will cost substantially more than an alternative which will meet the criteria contained in §20080(b) of Title 27, or would be impractical and would not promote attainment of applicable performance standards. The Discharger must also demonstrate that the proposed engineered alternative is consistent with the performance goal addressed by the particular prescriptive standard, and provides protection against water quality impairment equivalent to the prescriptive standard in accordance with §20080(b)(2) of Title 27.
36. Section 13360(a)(1) of the California Water Code allows the Board to specify the design, type of construction, and/or particular manner in which compliance must be met in waste discharge requirements or orders for the discharge of waste at solid waste disposal facilities.
37. The Discharger submitted a design plan for the expansion of an additional cell in Waste Management Unit 2 in a report dated 24 June 1997. The design proposed the construction of an engineered alternative in lieu of the prescriptive liner design specified in Resolution No. 93-62.
38. The engineered alternative proposed by the Discharger for the bottom liner of the waste management unit consists of, in ascending order: a 6-inch subgrade recompacted to at least 90 % of maximum dry density; a 40-mil thick HDPE geomembrane; a geosynthetic clay liner (GCL); a 60-mil HDPE geomembrane; and a 24-inch leachate drainage layer.

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39. Side slope liners are proposed to be constructed similarly to the base liner system except that it will be proof-rolled to eliminate the potential for punctures and the lower 40-mil HDPE geomembrane will not be installed. The subgrade for side slopes will not be over excavated and replaced with an engineered fill. It is proposed to be prepared in an appropriate manner using accepted engineering and construction methods so as to provide a surface that is smooth and free from rocks, sticks, and other debris that could damage or otherwise limit the performance of the geosynthetic clay layers and/or geomembrane.
40. The Discharger adequately demonstrated that construction of a Subtitle D prescriptive standard liner would be unreasonable and unnecessarily burdensome when compared to the proposed engineered alternative design. There is no clay source on-site or nearby and the cost of importing clay from off-site or mixing on-site soils with bentonite would cost substantially more than the alternative design.
41. The leachate collection and removal system will consist of a two-foot thick blanket drainage layer which will drain to perforated six inch diameter collection pipes installed into channels filled with drainage rock. The drainage channels/collection pipes will be constructed to fall at a slope of 0.5% toward a six inch diameter trunk line along the southern boundary of the cell. The trunk line will eventually drain to a leachate collection sump at the southwest corner of Waste Management Unit 2.
42. A pan lysimeter will be installed beneath the leachate collection and removal system collection pipes of the liner system for the purposes of vadose zone monitoring. The pan lysimeter will consist of: 1) an underlying 60-mil HDPE liner on a prepared subgrade below the leachate sump(s) and the leachate collection and removal system troughs; 2) eight inch diameter perforated HDPE piping encased in drainage rock; and 3) an overlying geotextile.
43. Construction will proceed only after all applicable construction quality assurance plans have been approved by Board staff.

CEQA CONSIDERATIONS

The action to revise waste discharge requirements for this facility is exempt from the provisions of the California Environmental Quality Act (CEQA), Public Resource Code §21000, et seq., and the CEQA guidelines, in accordance with Title 14, CCR, §1500, et seq.

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OTHER CONSIDERATIONS

44. On 9 October 1991, the United States Environmental Protection Agency (USEPA) promulgated regulations (Title 40, Code of Federal Regulations, Parts 257 and 258, "federal municipal solid waste [MSW] regulations" or "Subtitle D") that apply, in California, to dischargers who own or operate Class II or Class III landfill units at which municipal solid waste is discharged. The majority of the federal MSW regulations became effective on the "Federal Deadline", which was 9 October 1993. These requirements implement the prescriptive standards and performance goals of Subtitle D. Specifically, the engineered alternative design proposed as described herein satisfies the performance standard for liners in the federal MSW regulations contained in 40 CFR §§258.40(a)(1) and (c).
45. These requirements implement the prescriptive standard and performance goals of Title 27, California Code of Regulations, §20080 et seq. (Title 27).
46. These requirements implement the *Basin Plan*.
47. These requirements implement State Water Resources Control Board Resolution No. 93-62, Policy for Regulation of Discharges of Municipal Solid Waste, which implement the federal Subtitle D regulations.
48. All local agencies with jurisdiction to regulate land use, solid waste disposal, air pollution, and to protect public health have approved the use of this site for the discharges of waste to land stated herein.
49. The Board has notified the Discharger and interested agencies and persons of its intention to revise the waste discharge requirements for this facility.
50. In a public hearing, the Board heard and considered all comments pertaining to this facility and discharge.

IT IS HEREBY ORDERED that Order No. 96-160 is rescinded, and that the Madera Disposal Systems, Inc., and the County of Madera, their agents, successors, and assigns, in order to meet the provisions of Division 7 of the California Water Code and the regulations adopted thereunder, shall comply with the following:

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A. PROHIBITIONS

1. The discharge of 'hazardous waste' or 'designated waste' at this facility is prohibited. For the purposes of this Order, the term 'hazardous waste' is defined by Chapter 15 and the term 'designated waste' is defined by Title 27.
2. The discharge of wastes outside of a waste management unit or portions of a waste management unit specifically designed for their containment is prohibited.
3. The discharge of solid waste, liquid waste, leachate, or waste constituents to surface waters, ponded water, surface water drainage courses, or groundwater is prohibited.
4. The discharge of liquid or semi-solid waste (i.e., waste containing less than 50 percent solids), except dewatered sewage or water treatment sludge above a composite liner as provided in §20220(c) of Title 27, is prohibited.
5. The discharge of solid waste containing free liquid or moisture in excess of the waste's moisture holding capacity is prohibited.
6. The discharge of waste within 100 feet of surface waters is prohibited.
7. The discharge shall not cause the pollution or degradation of groundwater via the release of waste constituents in either liquid or gaseous phase.
8. The discharge of wastes shall not cause the pollution or degradation of any water supply.
9. The discharge of wastes which have the potential to reduce or impair the integrity of containment structures or which, if commingled with other wastes in the waste management unit, could produce violent reaction, heat or pressure, fire or explosion, toxic by-products, or reaction products, which, in turn:
 - a. require a higher level of containment than provided by the unit; or
 - b. are 'restricted hazardous wastes'; or

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c. impair the integrity of containment structures;

is prohibited.

10. The discharge shall not cause any increase in the concentration of waste constituents in soil or other geologic materials outside of the waste management unit if such waste constituents could migrate to waters of the State and cause a condition of degradation, pollution, or nuisance.
11. The discharge of waste to a waste management unit after it is closed is prohibited.

B. DISCHARGE SPECIFICATIONS

1. Wastes shall only be discharged to either:
 - a. that portion of an existing waste management unit that was permitted and/or received wastes prior to the Federal Deadline of 9 October 1993; or
 - b. to an area equipped with a composite liner containment system which meets the requirements for both liners and leachate collection and removal systems specified in Construction Specifications, D.1 - D.10 below.
2. A minimum separation of 5 feet shall be maintained between the base of the wastes and the highest anticipated elevation of underlying groundwater, including the capillary fringe.
3. Water used for facility maintenance shall be limited to the minimum amount necessary for dust control, construction, and, after closure, to the minimum amount necessary to irrigate cover vegetation or for other uses approved by Board staff.
4. Collected landfill leachate shall be discharged to an appropriate waste management unit in accordance with §20210 of Title 27 and in a manner consistent with the disposal of designated waste, or discharged on-site to a waste management unit that has a leachate collection and removal system and a composite liner.
5. Collected gas condensate from landfill gas control systems shall be discharged to an appropriate waste management unit in accordance with §20210 of Title 27 and in a manner consistent with the disposal of designated waste, or discharged on-site to a

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waste management unit that has a leachate collection and removal system and a composite liner.

6. Neither the treatment nor the discharge of wastes shall cause a pollution or nuisance as defined by the California Water Code, §13050.
7. The Discharger shall, in a timely manner, remove and relocate any wastes discharged at this facility in violation of this Order.

C. FACILITY SPECIFICATIONS

1. Waste management units and containment structures shall be designed and constructed to limit, to the greatest extent possible, ponding, infiltration, inundation, erosion, slope failure, washout, and overtopping as a result of a 100-year, 24-hour precipitation event.
2. Precipitation and drainage control systems shall be designed, constructed, and maintained to accommodate the anticipated volume of precipitation and peak flows from surface runoff under the 100-year, 24-hour precipitation conditions.
3. Cover materials shall be graded to divert precipitation from waste management units to prevent the ponding of surface water over wastes, and to resist erosion as a result of a 100-year, 24-hour precipitation event.
4. Waste management units or portions of waste management units shall be designed, constructed, and operated in compliance with precipitation and flood conditions contained in the Standard Provisions and Reporting Requirements referenced in Provision F.5 below.
5. All drainage control systems shall be designed and constructed to prevent the ponding of water above wastes.
6. Surface drainage from tributary areas and internal site drainage from surface or subsurface sources shall not contact or percolate through wastes.

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7. Areas with slopes greater than ten percent, surface drainage courses, and areas subject to erosion by wind or water shall be designed and constructed to prevent such erosion.
8. A minimum thickness of 6 inches of on-site cover soil shall be maintained over all but the active disposal area of the waste management unit. This area shall be properly graded and drained to prevent ponding and infiltration. The active disposal area shall be confined to the smallest practicable area based on the anticipated quantity of waste discharge and other waste management operations, and shall be covered daily in accordance with §20705(e) of Title 27.
9. Annually, prior to **1 October** and **within 7 days** following a major storm event, all precipitation and drainage control systems shall be inspected. By **31 October** of each year, or **within 30 days** of a major storm event, any necessary construction, maintenance, or repairs of precipitation and drainage control facilities shall be completed to prevent erosion or flooding of the facility and to prevent surface drainage from contacting or percolating through wastes.
10. By **15 November** of each year, or **within 45 days** of a major storm event, the Discharger shall submit a report to the Board describing the results of the inspection(s) and the measures taken to maintain the precipitation and drainage control systems.
11. The Discharger shall immediately notify the Board of any flooding, unpermitted offsite discharge, equipment failure, slope failure, or other change in site conditions which could impair the integrity of waste or leachate containment facilities or precipitation and drainage control structures.
12. The Discharger shall submit a *Storm Water Pollution and Prevention Plan* prior to the discharge of wastes to a newly constructed waste management unit or to an expansion of an existing waste management unit, for Board staff for review and approval. The Plan shall include a report demonstrating adequate design, construction, and operation of a facility liquid management system for protection from storm events, including precipitation and drainage controls, in accordance with Facility Specifications C.1 through C.8.

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D. CONSTRUCTION SPECIFICATIONS:

1. Materials used to construct liners shall have appropriate physical and chemical properties to ensure containment of discharged wastes over the operating life, closure, and post-closure maintenance period of a waste management unit or portion of a waste management unit.
2. Materials used to construct the leachate collection and removal system shall have appropriate physical and chemical properties to ensure the required transmission of leachate over the operating life, closure, and post-closure maintenance period of a waste management unit or portion of a waste management unit.
3. The Discharger shall submit for Board staff review and approval prior to construction, design plans and specifications for new waste management units and expansions of existing waste management units that include the following:
 - a) A Construction Quality Assurance Plan demonstrating that the proposed waste management unit will be constructed according to the approved specifications and plans, and shall provide quality control of the materials and construction practices used in construction and prevent the use of inferior products and/or materials which do not meet the approved design plans or specifications; and
 - b) A geotechnical evaluation of the area soils, evaluating their use as the foundation layer; and
 - c) A vadose zone monitoring system that includes geomembrane-lined pan lysimeters installed beneath the leachate collection and removal system collection drains and sump(s).
4. If compacted clay layers are used in a liner system, then hydraulic conductivities for the clay determined through laboratory methods shall be confirmed by a Sealed Double-Ring Infiltrometer (SDRI) field test, or an equivalent field test method approved by Board staff, of a test pad constructed in a manner duplicating the clay liner construction of the waste management unit or expansion portion of the waste management unit. Test pad construction methods, quality assurance/quality control procedures, and testing shall be in accordance with a construction quality assurance plan approved by Board staff and shall be sufficient to ensure that all parts of the liner meet the hydraulic conductivity and compaction requirements.

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5. Both the bottom liner and side slope liner of all new waste management units and expansion areas of existing waste management units shall be constructed in accordance with one of the following composite liner designs:
 - a) The prescriptive standard design which consists of a lower compacted soil layer that is a minimum of two feet thick with a hydraulic conductivity of 1×10^{-7} cm/sec or less and a minimum relative compaction of 90%. Immediately above the compacted soil layer, and in direct and uniform contact with the soil layer, shall be a synthetic flexible membrane component that shall be at least 40-mil thick (or at least 60-mil thick if composed of high density polyethylene [HDPE]); *or*
 - b) An engineered alternative liner system that is comprised, in ascending order, of the following:
 - 1) An eighteen-inch thick engineered soil foundation layer that shall be constructed of select fine-grained soil materials which are compacted to attain a hydraulic conductivity of 1×10^{-5} cm/sec or less, or meet the following gradation criteria:
 - (a) A maximum size of 3/8-inch;
 - (b) At least 30% of the material, by dry weight, passing the No. 200 U.S. Standard sieve;
 - (c) A gradation series (i.e., well-graded) that is amenable to compaction; and
 - (d) The foundation layer shall be compacted in lifts of six inches or less to 90% of maximum dry density and 2% of optimum moisture content, in accordance with the approved construction quality assurance plan.
 - 2) A nonwoven bottom geotextile, which may be part of the geosynthetic clay layer (GCL).

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- 3) A GCL that shall exhibit appropriate strength characteristics (hydrated) to accommodate stresses associated with specific landfill design parameters, with particular attention to interface and long-term creep shear.
 - 4) A 60-mil thick synthetic flexible membrane of HDPE; *or*
- c) An engineered alternative liner system of the waste management unit comprised, in ascending order, of the following:
- 1) A minimum 6-inch thick engineered soil foundation layer that shall be constructed of select soil materials, in accordance with the approved construction quality assurance plan, which meet the following criteria:
 - (a) A maximum size of 3/4-inch, subrounded or rounded clasts;
 - (b) A gradation series (i.e., well-graded) that is amenable to compaction; and
 - (c) Recompacted and rolled smooth to at least 90% of maximum dry density and within 2% of optimum moisture content.
 - 2) A 40-mil thick HDPE geomembrane to serve as a redundant bentonite retention and GCL placement cushion layer.
 - 3) A geosynthetic clay liner (GCL) that shall exhibit appropriate strength characteristics to accommodate stresses associated with specific landfill design parameters, with particular attention to interface and long-term creep shear.
 - 4) A 60-mil thick synthetic flexible membrane of high density polyethylene (HDPE), which may be part of the GCL; *or*
- d) An engineered alternative liner system as provided by §20080(b) and (c) of Title 27, which must be a composite liner that meets the performance goals of the prescriptive design in option a) above, and has been approved by the Executive Officer.

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6. If the Discharger proposes to construct a liner system in which a GCL is placed on top of the subgrade, the subgrade for the bottom and the side slopes of the waste management unit shall be prepared in an appropriate manner using accepted engineering and construction methods so as to provide a smooth surface that is free from rocks, sticks, or other debris that could damage or otherwise limit the performance of the GCL.
7. Hydraulic conductivities of liner materials shall be determined by laboratory tests using solutions with similar properties as the fluids that will be contained. Hydraulic conductivities of cover materials shall be determined by laboratory tests using water. Hydraulic conductivities determined through laboratory methods shall be confirmed by field testing in accordance with the Standard Provisions and Reporting Requirements, Provision D.1. Construction methods and quality assurance procedures shall be sufficient to ensure that all parts of the liner and cap meet the hydraulic conductivity and compaction requirements.
8. All new waste management units or expansion areas of existing waste management units shall have a blanket-type leachate collection and removal system, designed and operated to prevent the development of one foot or more of hydraulic head on the liner system at any time.
9. The leachate collection and removal system shall be designed, constructed, and maintained to collect twice the anticipated daily volume of leachate generated by the waste management unit or portion of the waste management unit and to prevent the buildup of hydraulic head on the underlying materials. The depth of fluid in any leachate collection and removal system sump shall be maintained as low as feasible and no greater than the minimum needed for safe pump operation.
10. Leachate generated by any waste management unit or portion of a waste management unit shall not exceed 85% of the design capacity of the sump pump. If leachate generation exceeds this value, or if the depth of fluid in the leachate removal and collection system exceeds the minimum needed for pump operation, or if the monitoring reveals substantial or progressive increases above the design anticipated daily volume of leachate generated by the waste management unit or portion of the waste management unit, the Discharger shall immediately notify the Board in writing **within seven days**. The notification shall include a timetable for remedial or corrective action necessary to reduce leachate production.

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11. Following the completion of construction of a waste management unit or portion of a waste management unit, and prior to discharge onto the newly constructed liner system, a construction report shall be submitted for Board staff review and approval. The report shall be certified by a registered civil engineer or a certified engineering geologist. It shall contain sufficient information and test results to verify that construction was in accordance with the design plans and specifications, and with the prescriptive standards and performance goals of Title 27.

The report for the waste management unit shall include as a minimum, but not be limited to, the following:

- a) Test results on the chemical and geotechnical properties of materials used in the containment structure, as specified in these waste discharge requirements.
 - b) Test results on the permeability of the clay liner if the prescriptive standard clay layer is used in the liner system.
 - c) Test results on the compatibility of the waste with the liner system.
 - d) Construction quality assurance and quality control procedures and results for all aspects of liner construction.
 - e) A geologic map and geologic cross-sections which show mappable lithologic units and structural features in relation to the waste management unit.
12. A third party independent of both the Discharger and the construction contractor shall perform all of the construction quality assurance monitoring and testing during the construction of a liner system.
 13. New waste management units and lateral expansions of existing waste management units shall not be located in wetlands unless the Discharger has successfully completed, and the Executive Officer has approved, all demonstrations required for such discharge under 40 CFR, Part 258.12(a).
 14. Partial or final closure of new, existing, or portions of a classified waste management unit shall be in compliance with the applicable provisions of Title 27. Classified waste management units or portions of waste management units shall be closed in accordance with the approved closure and post-closure maintenance plan and closure waste discharge requirements adopted by the Board. The Discharger

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shall notify the Board in writing of the waste management unit(s) or portion of waste management unit(s) to be closed at least **180 days** prior to the intended beginning of any partial or final closure activities. Closure shall not proceed in the absence of closure waste discharge requirements.

E. DETECTION MONITORING SPECIFICATIONS

1. The Discharger shall submit a groundwater detection monitoring report demonstrating compliance with §20380 of Title 27. The program is subject to approval by Board staff.
2. The Discharger shall comply with the detection monitoring provisions of Subchapter 3 of Chapter 3 of Title 27 for groundwater, surface water, and the unsaturated zone, and in accordance with Monitoring and Reporting Program No. 97-228. Detection monitoring for a new waste management unit or an expansion of an existing waste management unit shall be installed, operational, and the first round of samples collected **prior to** the discharge of wastes.
3. The Water Quality Protection Standard, as defined in §20390 of Title 27, shall consist of constituents of concern, their concentration limits, the point of compliance, and all water quality monitoring points. Constituents of concern shall include all waste constituents, their reaction products, and hazardous constituents that are reasonably expected to be in or derived from waste contained in the landfill. Concentration limits shall consist of the background concentrations of each constituent of concern or concentrations greater than background, pursuant to §20400 of Title 27.
4. The Discharger shall comply with the Water Quality Protection Standard which is specified in Monitoring and Reporting Program No. 97-228 and the Standard Provisions and Reporting Requirements, dated August 1997, which are attached to and made part of this order.
5. Organic compounds which are not naturally occurring have a background value of zero. The Water Quality Protection Standard for volatile organic compounds shall be taken as the detection limit of the analytical method used (i.e., 8260 and 8270). Evidence of exceeding the standard occurs when the constituent is detected by the appropriate method.

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6. The concentrations of the constituents of concern in waters passing the Point of Compliance shall not exceed the concentration limits established pursuant to Monitoring and Reporting Program No. 97-228.
7. For each monitoring event, the Discharger shall determine whether the landfill is in compliance with the Water Quality Protection Standard using procedures specified in Monitoring and Reporting Program No. 97-228 and §20415(e) of Title 27.
8. Methane and other landfill gases shall be adequately vented, removed from the waste management unit, or otherwise controlled to prevent the danger of explosion, adverse health effects, nuisance conditions, or the impairment of the beneficial uses of surface water or groundwater due to migration through the vadose (unsaturated) zone.

F. PROVISIONS

1. The Discharger shall maintain legible records of the volume and type of each waste discharged at each waste management unit or portion of a waste management unit, and the manner and location of the discharge. Such records shall be maintained at the facility until the beginning of the post-closure maintenance period. These records shall be available for review by representatives of the Board and of the State Water Resources Control Board at any time during normal business hours. At the beginning of the post-closure maintenance period, copies of these records shall be properly stored for future reference.
2. The Discharger shall maintain a copy of this order at the facility and make it available at all times to facility operating personnel, who shall be familiar with its contents, and to regulatory agency personnel upon request.
3. The Discharger shall comply with all applicable provisions of Title 27 and 40 CFR Part 258 that are not specifically referred to in this Order.
4. The Discharger shall comply with Monitoring and Reporting Program No. 97-228, which is incorporated into and made part of this Order. This compliance includes, but is not limited to, maintenance of waste containment facilities, precipitation and drainage controls, the groundwater monitoring system, leachate from the waste management unit(s), the vadose zone and surface water monitoring systems,

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throughout the active life of the waste management unit and the post-closure maintenance period.

5. The Discharger shall comply with the Standard Provisions and Reporting Requirements dated August 1997, which are hereby incorporated into this Order.
6. A violation of any of the Standard Provisions and Reporting Requirements or the Monitoring and Reporting Program is a violation of these waste discharge requirements.
7. Prior to discharging to a new waste management unit or to an expansion area of an existing waste management unit, the Discharger shall submit to the Board and the California Integrated Waste Management Board for approval, a report (or a revision as needed) describing a Periodic Load Checking Program to be implemented to preclude the discharge of 'hazardous wastes' and 'designated wastes'.
8. The Discharger or persons employed by the Discharger shall comply with all notice and reporting requirements of the State Department of Water Resources with regard to the construction, alteration, destruction, or abandonment of all monitoring wells used for compliance with this Order as required by §13750 through §13755 of the California Water Code.
9. The Discharger shall maintain waste containment facilities and precipitation and drainage controls, and shall continue to monitor groundwater in accordance with Monitoring and Reporting Program No. 97-228 throughout the active life of the waste management unit and the post-closure maintenance period.
10. The Discharger shall have the continuing responsibility to assure the protection of the beneficial uses of ground and surface waters from gases and leachate generated by discharged waste during the active life, closure and post-closure maintenance period of the waste management unit(s) and during the subsequent use of the property for other purposes.
11. In the event of any change in control or ownership of the land or waste discharge facilities described herein, the Discharger shall notify the succeeding owner or operator of the existence of this Order by letter, a copy of which shall be immediately forwarded to the Board.

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12. To assume operation under this Order, the succeeding owner or operator must apply in writing to the Board requesting transfer of the Order within 14 days of assuming ownership or operation of this facility. The request must contain the requesting entity's full legal name, the State of incorporation if a corporation, the name and address and telephone number of the persons responsible for contact with the Board, and a statement. The statement shall comply with the signatory requirements contained in Reporting Requirements No. 5 of the Standard Provisions and Reporting Requirements and state that the new owner or operator assumes full responsibility for compliance with this Order. Failure to submit the request shall be considered a discharge without requirements, a violation of the California Water Code. Transfer shall be approved or disapproved by the Board.
13. The Discharger shall notify the Board in writing of any proposed change in ownership or responsibility for construction or operation of the waste management unit. The Discharger shall also notify the Board of a material change in the character, location or volume of the waste discharge and of any proposed expansions or closure plans. This notification shall be given **90 days** prior to the effective date of the change and shall be accompanied by an amended Report of Waste Discharge and any technical documents that are needed to demonstrate continued compliance with these waste discharge requirements.
14. The Discharger shall, by **31 January** of each year, submit for approval by the Executive Officer, assurances of financial responsibility for initiating and completing corrective action for all know or foreseeable releases from the waste management units. The Discharger shall adjust the cost annually to account for inflation and any changes in facility design, construction, or operation.

The Discharger shall, by **31 January** of each year, submit for approval by the Executive Officer, a demonstration that it has established an irrevocable closure fund (or other means) naming the Regional Water Board as beneficiary to ensure closure and post-closure maintenance of each waste management unit in accordance with its approved closure plan. The Discharger shall adjust the cost annually to account for inflation and any changes in facility design, construction, or operation.
15. The Board will review this Order periodically and will revise these waste discharge requirements when necessary.
16. The Discharger shall complete the tasks contained in these waste discharge requirements in accordance with the following time schedule:

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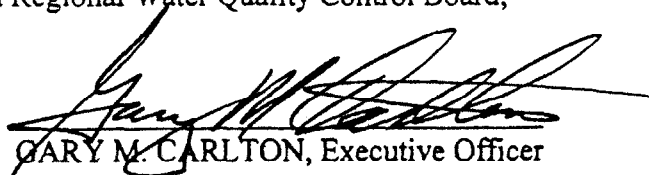
<u>Task</u>	<u>Compliance Date</u>
(a) Submit Title 27, Chapter 3, of Subchapter 3 Detection Monitoring Program, including:	
(1) Water Quality Protection Standard (see Discharge Specifications E.3-E.5) Submit a time shedule for submission of a Water Quality Protection Standard for the expansion waste management unit(s).	180 days prior to discharging to the expansion waste management unit(s)
(2) Detection Monitoring Program (see Discharge Specifications E.1 and E.2) Submit a work plan for installing a Detection Monitoring Program and time schedule for implementation of the required Detection Monitoring Program.	180 days prior to discharging to the expansion waste management unit(s)
(b) Financial Assurance (see Provision F.14) Submit a status report demonstrating compliance with financial assurance requirements for corrective action and closure.	31 January of each year
(c) Waste Management Unit Closure (see Construction Specification D.14) Submit a notification of final closure or partial closure activities of a waste management unit ot portion of a waste management unit.	At least 180 days prior to any closure activities

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<u>Task</u>	<u>Compliance Date</u>
(d) Waste Management Unit Construction (see Construction Specification D.3 and D.11)	
(1) Submit for Board staff approval, design plans and specifications, including a quality assurance/quality control plan that will assure design of the waste management unit or portion of the waste management unit, and LCRS are in accordance with Discharge Specifications D.1-D.9 and D.11-D.13.	60 days prior to waste management unit construction
(2) Submit for Board staff review and approval, a construction report following the completion of a waste management unit or a portion of a waste management unit.	Within 60 days after completion of waste management unit construction

I, GARY M. CARLTON, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Valley Region, on 24 October 1997.


GARY M. CARLTON, Executive Officer

VSM:vsm

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM NO. 97-228

FOR

COUNTY OF MADERA

AND

MADERA DISPOSAL SYSTEMS, INC.

FOR

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Compliance with this Monitoring and Reporting Program, with Title 27, California Code of Regulations, Section 20005, et seq. (hereafter Title 27), and with the Standard Provisions and Reporting Requirements dated August 1997, is ordered by Waste Discharge Requirements Order No. 97-228.

Failure to comply with this Program, or with the Standard Provisions and Reporting Requirements, constitutes noncompliance with the Waste Discharge Requirements and with the California Water Code, which can result in the imposition of civil monetary liability.

A. REQUIRED MONITORING REPORTS

<u>Report</u>	<u>Due</u>
1. Groundwater Monitoring (Section D.1)	See Table I
2. Annual Monitoring Summary Report (Standard Provisions and Reporting Requirements)	Annually
3. Unsaturated Zone Monitoring (Section D.2)	See Table II
4. Leachate Monitoring (Section D.3)	See Table III
5. Surface Water Monitoring (Section D.4)	See Table IV
6. Facility Monitoring (Section D.5)	As necessary
7. Response to a Release (Standard Provisions and Reporting Requirements)	As necessary

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B. REPORTING

The Discharger shall report monitoring data and information as required in this Monitoring and Reporting Program and as required in the Standard Provisions and Reporting Requirements. Reports which do not comply with the required format will be **REJECTED** and the Discharger shall be deemed to be in noncompliance with the waste discharge requirements. In reporting the monitoring data required by this program, the Discharger shall arrange the data in tabular form so that the date, the constituents, the concentrations, and the units are readily discernible. Data shall also be submitted in a digital database format acceptable to Board staff. The data shall be summarized in such a manner so as to illustrate clearly the compliance with waste discharge requirements or the lack thereof. A short discussion of the monitoring results, including notations of any water quality violations, shall precede the tabular summaries.

Field and laboratory tests shall be reported in each monitoring report. Monthly, quarterly, semi-annual, and annual monitoring reports shall be submitted to the Board in accordance with the following schedule for the calendar period in which samples were taken or observations made. The results of any monitoring done more frequently than required at the locations specified herein shall be reported to the Board.

<u>Sampling Frequency</u>	<u>Reporting Frequency</u>	<u>Reporting Periods End</u>	<u>Report Date Due</u>
Monthly	Quarterly	Last Day of Month	by Quarterly Schedule
Quarterly	Quarterly	31 March	30 April
		30 June	31 July
		30 September	31 October
		31 December	31 January
Semi-Annually	Semi-Annually	30 June	31 July
		31 December	31 January
Annually	Annually	31 December	31 January

The annual report to be submitted to the Board shall contain both tabular and graphical summaries of the monitoring data obtained during the previous twelve months, so as to show historical trends at each well. The report shall include a discussion of compliance with the waste discharge requirements and the water quality protection standard.

C. WATER QUALITY PROTECTION STANDARD AND COMPLIANCE PERIOD

1. Water Quality Protection Standard Report

For each waste management unit, the water quality protection standard consists of a list of constituents of concern and monitoring parameters, concentration limits for each constituent of concern, the point of compliance, and all monitoring points.

The Discharger shall submit a proposed water quality protection standard for review and approval in accordance with Detection Monitoring Specification E.3, E.4, and E.5 of Waste Discharge Requirements Order No. 97-228, in accordance with the Board staff approved time schedule in Task 16(a)(1) of the Waste Discharge Requirements. Board staff shall review the data and the proposed water quality protection standard in determining the final water quality protection standard for each monitored medium.

The report shall:

- a) Identify **all distinct bodies of surface and ground water** that could be affected in the event of a release from a waste management unit or portion of a waste management unit. This list shall include at least the uppermost aquifer and any permanent or ephemeral zones of perched groundwater underlying the waste management facility.
- b) Include a map showing the monitoring points and background monitoring points for the surface, saturated, and unsaturated zones and showing the point of compliance in accordance with §20405 of Title 27.
- c) Evaluate the perennial direction(s) of groundwater movement within the uppermost groundwater zone(s).

If subsequent sampling of the background monitoring point(s) indicates significant water quality changes due to either seasonal fluctuations or other reasons unrelated to waste management activities at the site, the Discharger may request modification of the water quality protection standard.

2. Constituents of Concern

The constituents of concern are the waste constituents, reaction products, and hazardous constituents that are reasonably expected to be in or derived from waste contained in the waste management unit. The constituents of concern for all waste management units at the facility are those listed in Table VI. The Discharger shall

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monitor all constituents of concern in Table VI every five years, or more frequently as required in accordance with a Corrective Action Program.

a. Monitoring Parameters

Monitoring parameters are the waste constituents, reaction products, hazardous constituents, and physical parameters that provide a reliable indication of a release from a waste management unit. The monitoring parameters for all waste management units are those listed in Tables I through V for the specified monitored medium.

3. Concentration Limits

The concentration limits for each constituent of concern are as follows:

- a. for naturally occurring constituents of concern, the concentration limit shall be the calculated statistical concentration limit.
- b. for anthropogenic (not naturally occurring) constituents, which have no natural and, therefore, no background values, the concentration limit (water quality protection standard) shall be the detection limit of the analytical method(s) used.

The Discharger shall use the statistical method approved by Board staff and the groundwater quality data obtained from the detection monitoring program to revise the concentration limits annually. The Discharger shall submit the revised concentration limits to Board staff for review and approval in the annual monitoring report.

4. Point of Compliance

The point of compliance for each waste management unit is the vertical surface located at the hydraulically downgradient limit of the waste management unit that extends through the uppermost aquifer underlying the unit.

a. Monitoring Points

All downgradient wells established for groundwater monitoring shall constitute the monitoring points for the groundwater quality protection standard. All approved monitoring wells, unsaturated zone monitoring devices, leachate, and surface water monitoring points shall be sampled and analyzed for monitoring

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parameters and constituents of concern as indicated and listed in Tables I through IV.

5. Compliance Period

The compliance period for each waste management unit shall be the number of years equal to the active life of the waste management unit plus the closure period. The compliance period is the minimum period during which the Discharger shall conduct a water quality monitoring program subsequent to a release from the unit. The compliance period shall begin anew each time the Discharger initiates an evaluation monitoring program.

D. MONITORING

The Discharger shall comply with the detection monitoring provisions of Title 27 for groundwater, surface water, and the unsaturated zone, in accordance with Detection Monitoring Specification E.2 of waste discharger requirements Order No. 97-228. Detection monitoring for a new waste management unit, or an expansion of an existing waste management unit shall be installed, operational, and the first round of samples collected prior to the discharge of wastes. All monitoring shall be conducted in accordance with a Sample Collection and Analysis Plan, which includes quality assurance/quality control standards, that has been approved by Board staff.

Method detection limits and practical quantitation limits shall be reported. All peaks shall be reported, including those which cannot be quantified and/or specifically identified. Metals shall be analyzed in accordance with the methods listed in Table VI or another method approved by the Executive officer.

1. Groundwater

The Discharger shall install and operate a groundwater detection monitoring system that complies with the applicable provisions of §20415 and §20420 of Title 27 in accordance with a Detection Monitoring Plan approved by Board staff. The Discharger shall collect, preserve, and transport groundwater samples in accordance with the approved Sample Collection and Analysis Plan.

The Discharger shall determine groundwater flow rate and direction in the uppermost aquifer and in any zones of perched water and in any additional zone of saturation monitored pursuant to this Monitoring and Reporting Program, and report the results

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quarterly, including the times of highest and lowest elevations of the water levels in the wells.

Groundwater samples shall be collected from the point of compliance wells, background wells, and any additional wells added as part of the approved groundwater monitoring system. Samples shall be collected and analyzed for the monitoring parameters in accordance with the methods listed in Table I or another method approved by the Executive Officer, and with the frequency specified in Table I. All monitoring parameters shall be graphed so as to show historical trends at each well. The monitoring parameters shall also be evaluated annually with regards to the cation/anion balance, and the results shall be graphically presented using a Stiff diagram or a Piper graph. Samples for the constituents of concern specified in Table I shall be collected and analyzed in accordance with the methods listed in Table VI or another method approved by the Executive Officer, every five years.

2. Unsaturated Zone Monitoring

The Discharger shall install and operate an unsaturated zone detection monitoring system that complies with the applicable provisions of §20415 and §20420 of Title 27 in accordance with a detection monitoring plan approved by Board staff. The Discharger shall collect, preserve, and transport samples in accordance with the quality assurance/quality control standards contained in the approved Sample Collection and Analysis Plan.

Unsaturated zone samples shall be collected from the monitoring devices and background monitoring devices of the approved unsaturated zone monitoring system. Samples shall be collected and analyzed for the listed constituents in accordance with the methods listed in Table II or another method approved by the Executive Officer, and with the frequency specified in Table II. All monitoring parameters shall be graphed so as to show historical trends at each monitoring point. Samples for the constituents of concern specified in Table II shall be collected and analyzed in accordance with the methods listed in Table VI or another method approved by the Executive Officer, every five years.

The pan lysimeters shall be checked monthly for liquid and monitoring shall include the volume of liquid recovered. Unsaturated zone monitoring reports shall be included with the corresponding semi-annual groundwater monitoring and shall include an evaluation of potential impacts of the facility on the unsaturated zone and compliance with the water quality protection standard.

3. Leachate Monitoring

All waste management unit leachate collection and removal system sumps shall be inspected weekly for leachate generation. Upon detection of leachate in a previously dry leachate collection and removal system, leachate shall be sampled and analyzed for the constituents listed in Table III or another method approved by the Executive Officer. Leachate monitoring shall be conducted as specified in Table III. The constituents of concern list shall include all constituents listed in Table VI. The quantity of leachate pumped from each sump shall be measured continuously and reported as Leachate Flow Rate (in gallons/day).

4. Surface Water Monitoring

The Discharger shall install and operate a surface water detection monitoring system where appropriate that complies with the applicable provisions of §20415 and §20420 of Title 27 and has been approved by Board staff.

For all monitoring points and background monitoring points assigned to surface water detection monitoring, samples shall be collected and analyzed for the monitoring parameters in accordance with the methods listed in Table IV or another method approved by the Executive Officer, and with the frequency specified in Table IV. All surface water monitoring samples shall be collected and analyzed for the constituents of concern specified in Table IV or another method approved by the Executive Officer, every five years. All monitoring parameters shall be graphed so as to show historical trends at each sample location.

5. Facility Monitoring

a. Facility Inspection

Annually, prior to the anticipated rainy season, but no later than **30 September**, the Discharger shall conduct an inspection of the facility. The inspection shall assess damage to the drainage control system, groundwater monitoring equipment (including wells, etc.), and shall include the pertinent Standard Observations defined in the Standard Provisions and Reporting Requirements (Definition 24). Any necessary construction, maintenance, or repairs shall be completed within 15 days of the inspection. By **15 November** of each year, the Discharger shall submit an annual report describing the results of the inspection and the repair measures implemented.

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b. Storm Events

The Discharger shall inspect all precipitation, diversion, and drainage facilities for damage immediately following *major storm events*. Necessary repairs shall be implemented within 15 days of the inspection. The Discharger shall report any damage and subsequent repairs within 30 days of completion of the repairs.

The Discharger shall implement the above monitoring program on the effective date of this Program.

Ordered by:


GARY M. CARLTON, Executive Officer

24 October 1997

(Date)

VSM:vsm

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TABLE I
GROUNDWATER DETECTION MONITORING PROGRAM

<u>Parameter</u>	<u>Units</u>	<u>Frequency</u>
Field Parameters		
Groundwater Elevation	Ft. & hundredths, M.S.L.	Quarterly
Temperature	°C	Semi-annual
Specific Conductance	µmhos/cm	Semi-annual
pH	pH units	Semi-annual
Turbidity	Turbidity units	Semi-annual
Monitoring Parameters		
Total Dissolved Solids (TDS)	mg/L	Semi-annual
Chloride	mg/L	Semi-annual
Carbonate	mg/L	Semi-annual
Bicarbonate	mg/L	Semi-annual
Nitrate - Nitrogen	mg/L	Semi-annual
Sulfate	mg/L	Semi-annual
Calcium	mg/L	Semi-annual
Magnesium	mg/L	Semi-annual
Potassium	mg/L	Semi-annual
Sodium	mg/L	Semi-annual
Volatile Organic Compounds (USEPA Method 8260, see Table V)	µg/L	Semi-annual
Constituents of Concern (see Table VI)		
Total Organic Carbon	mg/L	5 years
Inorganics (dissolved)	mg/L	5 years
Volatile Organic Compounds (USEPA Method 8260, extended list)	µg/L	5 years
Semi-Volatile Organic Compounds (USEPA Method 8270)	µg/L	5 years
Chlorophenoxy Herbicides (USEPA Method 8150)	µg/L	5 years
Organophosphorus Compounds (USEPA Method 8141)	µg/L	5 years

TABLE II
UNSATURATED ZONE DETECTION MONITORING PROGRAM

SOIL-PORE GAS

<u>Parameter</u>	<u>Units</u>	<u>Frequency</u>
Monitoring Parameters		
Volatile Organic Compounds (USEPA Method TO-14)	$\mu\text{g}/\text{cm}^3$	Semi-annual
Methane	%	Quarterly

PAN LYSIMETERS (or other vadose zone monitoring device)

<u>Parameter</u>	<u>Units</u>	<u>Frequency</u>
Field Parameters		
Specific Conductance	$\mu\text{mhos}/\text{cm}$	Semi-annual
pH	pH units	Semi-annual
Monitoring Parameters		
Total Dissolved Solids (TDS)	mg/L	Semi-annual
Chloride	mg/L	Semi-annual
Carbonate	mg/L	Semi-annual
Bicarbonate Alkalinity	mg/L	Semi-annual
Sulfate	mg/L	Semi-annual
Nitrate - Nitrogen (USEPA Method 8260, see Table V)	$\mu\text{g}/\text{L}$	Semi-annual

Constituents of Concern (see Table VI)

Total Organic Carbon	mg/L	5 years
Inorganics (dissolved)	mg/L	5 years
Volatile Organic Compounds (USEPA Method 8260, extended list)	$\mu\text{g}/\text{L}$	5 years
Semi-Volatile Organic Compounds (USEPA Method 8270)	$\mu\text{g}/\text{L}$	5 years
Chlorophenoxy Herbicides (USEPA Method 8150)	$\mu\text{g}/\text{L}$	5 years
Organophosphorus Compounds (USEPA Method 8141)	$\mu\text{g}/\text{L}$	5 years

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TABLE III
LEACHATE DETECTION MONITORING PROGRAM

<u>Parameter</u>	<u>Units</u>	<u>Frequency</u>
Field Parameters		
Total Flow	Gallons	Monthly
Flow Rate	Gallons/Day	Monthly
Specific Conductance	µmhos/cm	Monthly
pH	pH units	Monthly
Monitoring Parameters		
Total Dissolved Solids (TDS)	mg/L	Quarterly
Chloride	mg/L	Quarterly
Carbonate	mg/L	Quarterly
Bicarbonate Alkalinity	mg/L	Quarterly
Sulfate	mg/L	Quarterly
Nitrate - Nitrogen	mg/L	Quarterly
Volatile Organic Compounds (USEPA Method 8260, see Table V)	µg/L	Quarterly
Constituents of Concern (see Table VI)		
Total Organic Carbon	mg/L	5 years
Inorganics (dissolved)	mg/L	5 years
Volatile Organic Compounds (USEPA Method 8260, extended list)	µg/L	5 years
Semi-Volatile Organic Compounds (USEPA Method 8270)	µg/L	5 years
Chlorophenoxy Herbicides (USEPA Method 8150)	µg/L	5 years
Organophosphorus Compounds (USEPA Method 8141)	µg/L	5 years

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TABLE IV
SURFACE WATER DETECTION MONITORING PROGRAM

<u>Parameter</u>	<u>Units</u>	<u>Frequency</u>
Field Parameters		
Temperature	°C	Semi-annual
Specific Conductance	µmhos/cm	Semi-annual
pH	pH units	Semi-annual
Turbidity	turbidity units	Semi-annual
Monitoring Parameters		
Total Dissolved Solids (TDS)	mg/L	Semi-annual
Chloride	mg/L	Semi-annual
Carbonate	mg/L	Semi-annual
Bicarbonate	mg/L	Semi-annual
Nitrate - Nitrogen	mg/L	Semi-annual
Sulfate	mg/L	Semi-annual
Calcium	mg/L	Semi-annual
Magnesium	mg/L	Semi-annual
Potassium	mg/L	Semi-annual
Sodium	mg/L	Semi-annual
Volatile Organic Compounds (USEPA Method 8260, see Table V)	g/L	Semi-annual
Constituents of Concern (see Table VI)		
Total Organic Carbon	mg/L	5 years
Inorganics (dissolved)	mg/L	5 years
Volatile Organic Compounds (USEPA Method 8260, extended list)	µg/L	5 years
Semi-Volatile Organic Compounds (USEPA Method 8270)	µg/L	5 years
Chlorophenoxy Herbicides (USEPA Method 8150)	µg/L	5 years
Organophosphorus Compounds (USEPA Method 8141)	µg/L	5 years

TABLE V
MONITORING PARAMETERS FOR DETECTION MONITORING

Surrogates for Metallic Constituents:

pH
Total Dissolved Solids
Specific Conductivity
Chloride
Sulfate
Nitrate nitrogen

Constituents included in VOC:

USEPA Method 8260

Acetone
Acrylonitrile
Benzene
Bromochloromethane
Bromodichloromethane
Bromoform (Tribromomethane)
Carbon disulfide
Carbon tetrachloride
Chlorobenzene
Chloroethane (Ethyl chloride)
Chloroform (Trichloromethane)
Dibromochloromethane (Chlorodibromomethane)
1,2-Dibromo-3-chloropropane (DBCP)
1,2-Dibromoethane (Ethylene dibromide; EDB)
o-Dichlorobenzene (1,2-Dichlorobenzene)
p-Dichlorobenzene (1,4-Dichlorobenzene)
trans-1,4-Dichloro-2-butene
1,1-Dichloroethane (Ethylidene chloride)
1,2-Dichloroethane (Ethylene dichloride)
1,1-Dichloroethylene (1,1-Dichloroethene; Vinylidene chloride)
cis-1,2-Dichloroethylene (cis-1,2-Dichloroethene)
trans-1,2-Dichloroethylene (trans-1,2-Dichloroethene)
1,2-Dichloropropane (Propylene dichloride)
cis-1,3-Dichloropropene
trans-1,3-Dichloropropene
Ethylbenzene
2-Hexanone (Methyl butyl ketone)
Methyl bromide (Bromomethane)
Methyl chloride (Chloromethane)
Methylene bromide (Dibromomethane)

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TABLE V
MONITORING PARAMETERS FOR DETECTION MONITORING
Continued

Methylene chloride (Dichloromethane)
Methyl ethyl ketone (MEK: 2-Butanone)
Methyl iodide (Iodomethane)
4-Methyl-2-pentanone (Methyl isobutylketone)
Styrene
1,1,1,2-Tetrachloroethane
1,1,2,2-Tetrachloroethane
Tetrachloroethylene (Tetrachloroethene; Perchloroethylene)
Toluene
1,1,1-Trichloroethane (Methylchloroform)
1,1,2-Trichloroethane
Trichloroethylene (Trichloroethene)
Trichlorofluoromethane (CFC- 11)
1,2,3-Trichloropropane
Vinyl acetate
Vinyl chloride
Xylenes

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TABLE VI
CONSTITUENTS OF CONCERN & APPROVED USEPA ANALYTICAL METHODS

<u>Inorganics (dissolved):</u>	<u>USEPA Method</u>
Aluminum	6010
Antimony	6010
Barium	6010
Beryllium	6010
Cadmium	6010
Chromium	6010
Cobalt	6010
Copper	6010
Silver	6010
Tin	6010
Vanadium	6010
Zinc	6010
Iron	6010
Manganese	6010
Arsenic	7061
Lead	7421
Mercury	7470
Nickel	7520
Selenium	7741
Thallium	7841
Cyanide	9010
Sulfide	9030

Volatile Organic Compounds:

USEPA Method 8260

Acetone
Acetonitrile (Methyl cyanide)
Acrolein
Acrylonitrile
Allyl chloride (3-Chloropropene)
Benzene
Bis(2-ethylhexyl) phthalate
Bromochloromethane (Chlorobromomethane)
Bromodichloromethane (Dibromochloromethane)
Bromoform (Tribromomethane)
Carbon disulfide
Carbon tetrachloride
Chlorobenzene
Chloroethane (Ethyl chloride)
Chloroform (Trichloromethane)
Chloroprene

TABLE VI
CONSTITUENTS OF CONCERN & APPROVED USEPA ANALYTICAL METHODS
Continued

Dibromochloromethane (Chlorodibromomethane)
1,2-Dibromo-3-chloropropane (DBCP)
1,2-Dibromoethane (Ethylene dibromide; EDB)
o-Dichlorobenzene (1,2-Dichlorobenzene)
m-Dichlorobenzene (1,3-Dichlorobenzene)
p-Dichlorobenzene (1,4-Dichlorobenzene)
trans- 1,4-Dichloro-2-butene
Dichlorodifluoromethane (CFC 12)
1,1 -Dichloroethane (Ethylidene chloride)
1,2-Dichloroethane (Ethylene dichloride)
1,1 -Dichloroethylene (1, 1-Dichloroethene; Vinylidene chloride)
cis- 1,2-Dichloroethylene (cis- 1,2-Dichloroethene)
trans- 1,2-Dichloroethylene (trans- 1,2-Dichloroethene)
1,2-Dichloropropane (Propylene dichloride)
1,3-Dichloropropane (Trimethylene dichloride)
2,2-Dichloropropane (Isopropylidene chloride)
1,1 -Dichloropropene
cis- 1,3-Dichloropropene
trans- 1,3-Dichloropropene
Ethylbenzene
Hexachlorobutadiene
2-Hexanone (Methyl butyl ketone)
Isobutyl alcohol
Isodrin
Methacrylonitrile
Methyl bromide (Bromomethane)
Methyl chloride (Chloromethane)
Methyl ethyl ketone (MEK; 2-Butanone)
Methyl iodide (Iodomethane)
Methyl methacrylate
4-Methyl-2-pentanone (Methyl isobutyl ketone)
Methylene bromide (Dibromomethane)
Methylene chloride (Dichloromethane)
Naphthalene
Propionitrile (Ethyl cyanide)
Styrene
1,1,1,2-Tetrachloroethane
1,1,2,2-Tetrachloroethane
Tetrachloroethylene (Tetrachloroethene; Perchloroethylene; PCE)
Toluene 1,2,4-Trichlorobenzene
1,1,1 -Trichloroethane, Methylchloroform
1,1,2-Trichloroethane
Trichloroethylene (Trichloroethene; TCE)

TABLE VI
CONSTITUENTS OF CONCERN & APPROVED USEPA ANALYTICAL METHODS
Continued

Trichlorofluoromethane (CFC- 11)
1,2,3-Trichloropropane
Vinyl acetate
Vinyl chloride (Chloroethene)
Xylene (total)

Semi-Volatile Organic Compounds:

USEPA Method 8270 - base, neutral, & acid extractables

Acenaphthene
Acenaphthylene
Acetophenone
2-Acetylaminofluorene (2-AAF)
Aldrin
4-Aminobiphenyl
Anthracene
Benzo[a]anthracene (Benzanthracene)
Benzo[b]fluoranthene
Benzo[k]fluoranthene
Benzo[g,h,i]perylene
Benzo[a]pyrene
Benzyl alcohol
alpha-BHC
beta-BHC
delta-BHC
gamma-BHC (Lindane)
Bis(2-chloroethoxy)methane
Bis(2-chloroethyl) ether (Dichloroethyl ether)
Bis(2-chloro-1-methylethyl) ether (Bis(2-chloroisopropyl) ether; DCIP)
4-Bromophenyl phenyl ether
Butyl benzyl phthalate (Benzyl butyl phthalate)
Chlordane
p-Chloroaniline
Chlorobenzilate
p-Chloro-m-cresol (4-Chloro-3-methylphenol)
2-Chloronaphthalene
2-Chlorophenol
4-Chlorophenyl phenyl ether
Chrysene
o-Cresol (2-methylphenol)
m-Cresol (3-methylphenol)
p-Cresol (4-methylphenol)

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TABLE VI
CONSTITUENTS OF CONCERN & APPROVED USEPA ANALYTICAL METHODS
Continued

4,4'-DDD
4,4'-DDE
4,4'-DDT
Diallate
Dibenz[a,h]anthracene
Dibenzofuran
Di-n-butyl phthalate
o-Dichlorobenzene (1,2-Dichlorobenzene)
m-Dichlorobenzene (1,3-Dichlorobenzene)
p-Dichlorobenzene (1,4-Dichlorobenzene)
3,3'-Dichlorobenzidine
2,4-Dichlorophenol
2,6-Dichlorophenol
Dieldrin
Diethyl phthalate
p-(Dimethylamino)azobenzene
7,12-Dimethylbenz[a]anthracene
3,3'-Dimethylbenzidine
2,4-Dimethylphenol (m-Xylenol)
Dimethyl phthalate
m-Dinitrobenzene
4,6-Dinitro-o-cresol (4,6-Dinitro-2-methylphenol)
2,4-Dinitrophenol
2,4-Dinitrotoluene
2,6-Dinitrotoluene
Di-n-octyl phthalate
Diphenylamine
Endosulfan I
Endosulfan II
Endosulfan sulfate
Endrin
Endrin aldehyde
Ethyl methacrylate
Ethyl methanesulfonate
Famphur
Fluoranthene
Fluorene
Heptachlor
Heptachlor epoxide
Hexachlorobenzene
Hexachlorobutadiene
Hexachlorocyclopentadiene
Hexachloroethane

TABLE VI
CONSTITUENTS OF CONCERN & APPROVED USEPA ANALYTICAL METHODS
Continued

Hexachloropropene
Indeno(1,2,3-c,d)pyrene
Isophorone
Isosafrole
Kepone
Methapyrilene
Methoxychlor
3-Methylcholanthrene
Methyl methanesulfonate
2-Methylnaphthalene
Naphthalene
1,4-Naphthoquinone
1-Naphthylamine
2-Naphthylamine
o-Nitroaniline (2-Nitroaniline)
m-Nitroaniline (3-Nitroaniline)
p-Nitroaniline (4-Nitroaniline)
Nitrobenzene
o-Nitrophenol (2-Nitrophenol)
p-Nitrophenol (4-Nitrophenol)
N-Nitrosodi-n-butylamine (Di-n-butylnitrosamine)
N-Nitrosodiethylamine (Diethylnitrosamine)
N-Nitrosodimethylamine (Dimethylnitrosamine)
N-Nitrosodiphenylamine (Diphenylnitrosamine)
N-Nitrosodipropylamine (N-Nitroso-N-dipropylamine; Di-n-propylnitrosamine)
N-Nitrosomethylethylamine (Methylethylnitrosamine)
N-Nitrosopiperidine
N-Nitrosopyrrolidine
5-Nitro-o-toluidine
Pentachlorobenzene
Pentachloronitrobenzene (PCNB)
Pentachlorophenol
Phenacetin
Phenanthrene
Phenol
p-Phenylenediamine
Polychlorinated biphenyls (PCBs; Aroclors)
Pronamide
Pyrene
Safrole
1,2,4,5-Tetrachlorobenzene
2,3,4,6-Tetrachlorophenol
o-Toluidine

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TABLE VI
CONSTITUENTS OF CONCERN & APPROVED USEPA ANALYTICAL METHODS
Continued

Toxaphene
1,2,4-Trichlorobenzene
2,4,5-Trichloropheno
1 2,4,6-Trichlorophenol
0,0,0-Triethyl phosphorothioate
sym-Trinitrobenzene

Chlorophenoxy Herbicides:

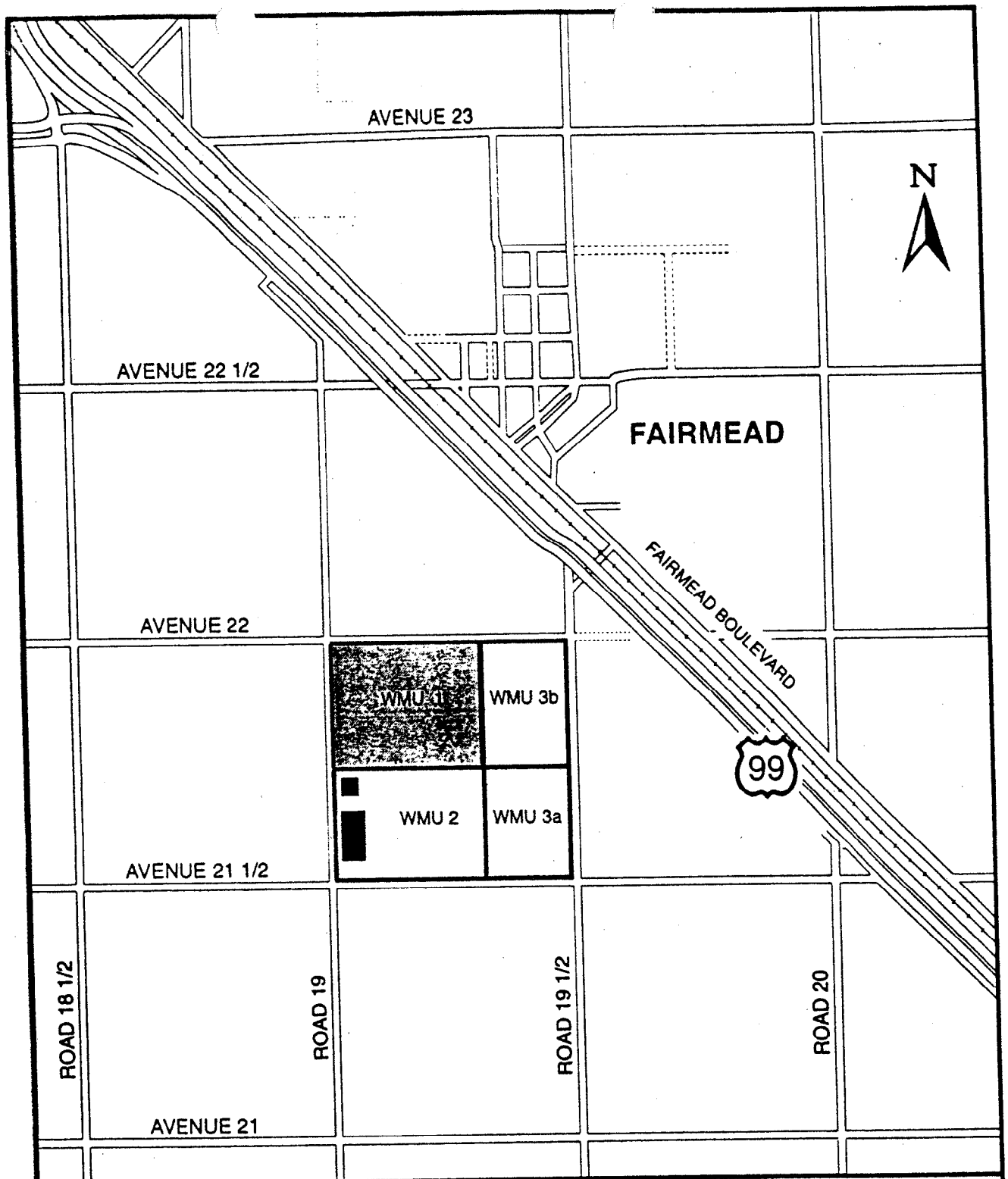
USEPA Method 8150

2,4-D (2,4-Dichlorophenoxyacetic acid)
Dinoseb (DNBP; 2-sec-Butyl-4,6-dinitrophenol)
Silvex (2,4,5-Trichlorophenoxypropionic acid; 2,4,5-TP)
2,4,5-T (2,4,5-Trichlorophenoxyacetic acid)

Organophosphorus Compounds:

USEPA Method 8141

0,0-Diethyl 0-2-pyrazinyl phosphorothioate (Thionazin)
Dimethoate
Disulfoton
Methyl parathion (Parathion methyl)
Parathion
Phorate



Scale: 1inch = 750 feet



Existing Facility



Expansion Area



Mammoth Recycling Facility

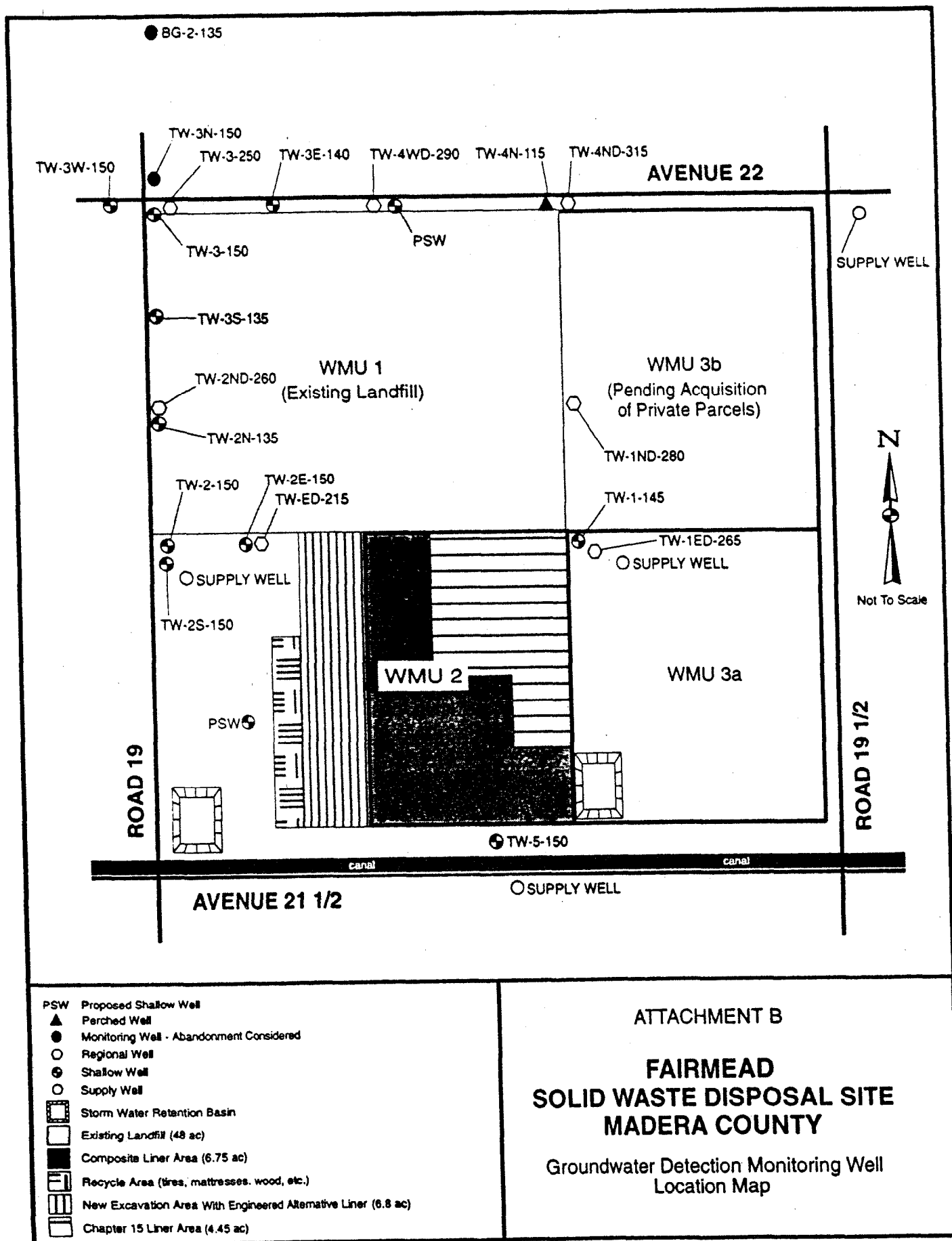


Office

ATTACHMENT A

FAIRMEAD SOLID WASTE DISPOSAL SITE

SECTION 14, T10S, R16E, MDB&M
Madera County



ATTACHMENT B

FAIRMEAD SOLID WASTE DISPOSAL SITE MADERA COUNTY

Groundwater Detection Monitoring Well
Location Map

INFORMATION SHEET

WASTE DISCHARGE REQUIREMENTS MADERA DISPOSAL SYSTEMS, INC., AND THE COUNTY OF MADERA FAIRMEAD MUNICIPAL SWDS MADERA COUNTY

The Fairmead Municipal Solid Waste Disposal Site (facility) is approximately one mile south of Fairmead at the intersection of Road 19 and Avenue 22. The facility property is owned by the County of Madera and operated by Madera Disposal Systems, Inc. The County of Madera and Madera Disposal Systems, Inc., are hereafter jointly referred to as Discharger.

The facility consists of an existing 48-acre, unlined waste management unit (Waste Management Unit 1) and two expansion waste management units (Waste Management Units 2 and 3). Waste Management Unit 2 is comprised of a 4.45-acre cell constructed with a 1×10^{-6} cm/sec Chapter 15 soil liner with a leachate collection and removal system (LCRS) and a 6.75-acre cell constructed with a Subtitle D composite liner and LCRS. The Discharger proposes to expand into a 6.8-acre cell of Waste Management Unit 2 and construct an engineered alternative composite liner consisting of the following in ascending order: a 6-inch subgrade recompacted to 90% relative density; a 40-mil thick HDPE geomembrane; a geosynthetic clay liner (GCL); a 60-mil HDPE geomembrane; and a 24-inch leachate drainage layer.

Groundwater monitoring data indicates that groundwater exists in three zones, a perched groundwater zone approximately 103 feet bgs, a shallow groundwater zone approximately 110-127 feet bgs, and a regional groundwater zone approximately 164-183 feet bgs. The flow direction of regional groundwater is to the northwest and that of shallow groundwater is predominantly vertically downward. The flow direction of perched groundwater has not yet been determined. The *Water Quality Control Plan For The San Joaquin River Basin, Third Edition*, designates the beneficial uses of the groundwater as municipal and domestic supply (MUN), agricultural, and industrial supply.

Detection groundwater monitoring has determined that the existing unlined waste management unit has impacted the perched groundwater zone with the volatile organic compounds PCE, CFC-11, and CFC-12, and to a lesser extent, TCE, cis-1,2-DCE, and 1,1-DCA; and the shallow groundwater zone with PCE, CFC-11, and CFC-12, and to a lesser extent, chloroethane, TCE, and 1,1-DCE. The Discharger has implemented an Evaluation Monitoring Program to delineate the lateral and vertical extent of the volatile organic compound plume in groundwater in accordance with a Cleanup and Abatement Order.

The proposed waste discharge requirements implement Title 27, California Code of Regulations, §20005 et seq. and federal regulations (Subtitle D), including waste management unit construction and operation and groundwater detection monitoring.

VSM:vsm:10/24/97